

REMARKS

In the Office Action dated June 28, 2004, the Examiner rejected claims 1-3, 5, 12, and 14 under 35 USC 103(a) as unpatentable over Hasegawa (U.S. Patent Publication 2003/0038343) in view of Ishikawa (U.S. Patent 6,583,032), rejected claims 6-8 and 13 under 35 USC 103 as unpatentable over Hasegawa and Ishikawa and further in view of Walker (U.S. Patent No. 6,275,277), rejected claims 10 and 15 under 35 USC 103 as unpatentable over Ishikawa and Ueta (U.S. Patent No. 6,590,919, and rejected claims 11 and 16 under 35 USC 103 over Ishikawa in view of Hahn (U.S. Patent No. 6,131,880). Claims 1-3, 5-8, and 10-16 remain at issue.

The Attorney for the Applicant wishes to thank the Examiner for the telephone conference on July 9, 2004. During the interview, the Hasegawa reference and the claims of the present invention were discussed. A summary of the conversation is provided in the comments below.

The Art Rejection

The Applicants disagree with the Examiner's rejection that claims 1-3, 5, 12, and 14 are obvious in view of Hasegawa and Ishikawa. The two references, either alone or in combination, failed to teach or suggest the present invention as claimed. Specifically, claim 1 recites:

"imaging the wafer through a layer of opaque material formed on the wafer"

A careful review of the Hasegawa reference shows that this feature is not taught. The layer (115) the examiner refers to is a protective resin layer provided on the top or active surface of the wafer. See for example paragraph [0061] and figures 2, 4, and 10. A review of figures 12(A)-12(E) indicate, however, that Hasegawa explicitly teaches that the wafer is not imaged through the resin layer (115).

Figure 12(A) shows the resin layer (115) on the top or active surface of wafer (1101). See paragraph [0103].

Figures 12(B) and 12(C) show the wafer resting on a holder (1203) with the active surface facing down. As a consequence, the non-active or back surface of the wafer is facing upward and the resin layer (115) on the active surface of the wafer is facing down.

Figure 12(D) shows an infrared camera (1211) imaging the back surface of the wafer. See paragraph [0108]. Since the resin layer (115) is on the active surface of the wafer and is facing down, the camera (1211) does not image the wafer through the resin layer (115).

In the Office Action, the Examiner states that Hesegawa discloses the “*imaging the wafer (1101) through a layer of opaque layer (115)*” On the contrary, Hesegawa explicitly teaches away from the present invention. The non-active or back surface of the wafer in Hesegawa is imaged, not the active front surface of the wafer with the resin layer (115). The Examiner has therefore misconstrued the actual teaching of Hesegawa.

Ishikawa teaches a method of scribing wafers that involves, as illustrated in Figure 1, the steps of: (i) back-grinding the wafer; (ii) polishing the back surface of the wafer; (iii) forming grooves to a “predetermined depth” on the back surface of the wafer along the saw streets (see Col. 3, lines 10-19); and (iv) singulating the individual die from the wafer using a roller to apply pressure to the wafer. The pressure causes the wafer to break along the grooves in the saw streets (see Col. 4, lines 22-35).

Ishikawa further teaches the use of an infrared irradiating device to locate the saw streets on the wafer. The locations are then provided to a diamond cutter which is used to cut the grooves to the predetermined depth along the saw streets on the wafer. See Col. 3, lines 41-59.

Ishikawa therefore does not anticipate claim 1 in several regards:

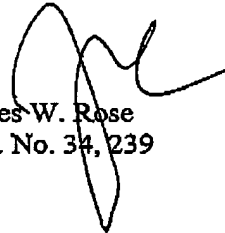
- i. Ishigawa fails to teach or suggest the application of an opaque material onto the wafer;
- ii. Since there is no opaque material formed on the wafer, Ishigawa fails to teach or suggest the imaging of the wafer through an opaque material; and
- iii. Ishigawa teaches the formation of “grooves” having a “predetermined depth”. The grooves cause the wafer to break along the saw streets when pressure is applied to the wafer. Ishigawa therefore actually teaches away from the present invention as claimed which calls for the dicing of the wafer to singulate the individual die on the wafer.

A review of the two references indicates that the Examiner has failed to demonstrate a prima facie case of obviousness. Since both reference fail to teach or suggest the imaging of the wafer to through the opaque material, the rejection is improper.

The Applicants therefore submit that claim 1 is allowable. Although patentable in their own right, claims 2, 3 and 5-8 and 10-11 are allowable based on their dependency on claim 1. Similarly, claims 12-16 are allowable for essentially the same reasons as provided above with regard to claim 1.

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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